

CLAIMS

1. A control method for a fuel injection system having a spill valve (20), a nozzle control valve (22) and a valve needle (12) which is engageable with a seating
5 to control fuel injection, the method comprising:

applying a first drive current signal (30; 130) to the spill valve (20) to move the spill valve (20) into a closed state and applying a second drive current signal (40) to the nozzle control valve (22) to move the nozzle control valve (22) to an open state,
10 thereby to lift the valve needle (12) from the seating to initiate a main injection of fuel, and

modifying the first drive current signal (30; 130) applied to the spill valve (20) so as to move the spill valve (20) from the closed state to an open state during a spill
15 valve opening period followed by modifying the second drive current signal (40) applied to the nozzle control valve (22) to move the nozzle control valve (22) from the open state to a closed state during the spill valve opening period, so as to urge the valve needle (12) towards its seating to terminate the main injection of fuel.

20 2. The control method as claimed in claim 1, including switching the first drive current signal (130) off to provide a first actuation pulse (131) to initiate the spill valve opening period and switching the first drive current signal (130) on and then off again to provide a second actuation pulse (132) prior to termination of the spill valve opening period.

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drive current signal (40) is switched off to move the nozzle control valve (22) to its open state.

9. A control method for delivering a main injection of fuel followed by a post
5 injection of fuel, the method comprising:

actuating a spill valve (20) and a nozzle control valve (22) to initiate the main
injection of fuel,

- 10 terminating the main injection of fuel by (i) actuating the spill valve (20) at a first
time to cause the spill valve (20) to move to an open state followed by (ii) actuating
a nozzle control valve (22) at a second time to cause the nozzle control valve (22) to
move into a closed state,

- 15 subsequently actuating the spill valve (20) at a third time to cause the spill valve
(20) to move from its open state to a closed state, and

- initiating the post injection of fuel by actuating the nozzle control valve (22) to
move into an open state, whereby the difference between the first and third times is
20 selected to provide a relatively high pressure post injection of fuel so as to reduce
smoke emissions levels.

10. The control method as claimed in claim 9, whereby the spill valve (20) is
actuated to move between its open and closed states by modifying a spill valve drive
25 current signal (30).